

# Student perceptions of an online surgical teaching programme during the COVID-19 pandemic at the University of KwaZulu-Natal: A short report

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**Background.** The COVID-19 pandemic has led to an unprecedented global health crisis, with impacts on many facets of the health system, including lack of access to regular training wards and the need for social distancing, which posed particular challenges to undergraduate teaching.

**Objectives.** To explore the perceptions of students of the online surgical programme at the University of KwaZulu-Natal (UKZN).

**Methods.** An online survey was administered to 258 final-year students. Data were collected on student demographics, the impact of COVID-19 restrictions on the teaching programme, engagement and learning from live Zoom sessions, overall perceptions about the module and general feedback on students' experience of the programme.

**Results.** Most students (84%, 77/91) supported the need to change to the virtual programme. The module was perceived as well-structured (89%, 81/91). Most students (87%, 79/91) regarded the online resource materials as beneficial. Analysis of open-ended responses showed that asynchronous delivery allowed students to review and revisit resources in their own time. Student challenges included poor internet connectivity, difficulty in concentrating where live sessions exceeded an hour, and lack of clinical exposure.

**Conclusion.** Online teaching in medical education is a feasible option for remote learning. However, it cannot replace the benefits gained during clinical exposure. Findings from this study will help to set a benchmark for online surgical training at UKZN and develop best practices for blended teaching models. As we adapt to a new normal in the era of COVID-19, the disruptions and results of innovative teaching methods have the potential to change the future of medical education.

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The COVID-19 pandemic has led to an unprecedented global health crisis, with impacts on many facets of the health system, and lack of access and the need for social distancing, particularly, imposed challenges to undergraduate training that traditionally used ward-based exposure and contact with patients for medical training. A decision was made to transition all teaching and learning of final-year surgery students to an online/virtual teaching platform.

E-learning is defined as using the internet and multimedia technology to deliver instruction and facilitate learning.<sup>[1]</sup> Advantages include flexibility of learning, and knowledge that can be widely distributed and easily updated. Barriers to e-learning relate to internet connectivity, availability and cost of devices to access content, impersonal learning and difficulties with student-teacher engagement.<sup>[1]</sup> A particular challenge of online teaching in medical education is how to replicate the experience of clinical encounters. Technology such as videos, podcasts and computer simulations may be used to facilitate student learning.<sup>[2]</sup> This study was conducted to explore the perceptions of final-year MB ChB (medical) students of the online teaching programme in general surgery at the University of KwaZulu-Natal (UKZN).

## Objectives

To explore student perceptions of the changes due to COVID-19 restrictions on access to learning material, interactions during the learning process and the value of the programme in preparing them for internship.

## Methods

A 6-week online surgical module was developed for final-year students. It comprised a flipped-classroom approach with synchronous (live lectures/tutorials via the Zoom platform) and asynchronous (videos on clinical examination and procedural skills, PowerPoint presentations and text resources on the university online learning management system, Moodle) activities. Table 1 shows the alignment between learning outcomes, teaching and assessment strategies, while the appendix (<https://www.samedical.org/file/1943>) details a list of core topics covered during the module.

End-of-module assessment included a theory-based multiple-choice question paper and a paper case of a clinical vignette that replaced the clinical assessment. A quantitative, cross-sectional study was conducted. Student perceptions of the 2020 final-year online surgical module were evaluated using an online survey comprising 44 items, including dichotomous, multiple-choice and Likert response scale questions with some open-ended questions. Microsoft (USA) forms were used as the online platform to deliver the self-administered surveys. Only one response per student was collected, and no email addresses or identifiers were collected, to ensure anonymity. The questionnaire collected data related to demographics, implications of COVID-19 restrictions, access to online learning material, engagement in live Zoom sessions and overall module evaluation. The questionnaire was piloted with 16 final-year students, and was found to have high internal consistency, as evidenced by the overall Cronbach's  $\alpha$  value

**Table 1. Constructive alignment of learning outcomes, teaching and assessment methods**

Learning outcomes: At the end of the module, the student should be able to:	Teaching methods: Content on core topics in general surgery (appendix)	Assessment methods
Take a detailed clinical history	Online resources, case-based tutorials	Formative assessment: Weekly quiz (multiple-choice questions (MCQ)) with immediate feedback
Carry out an appropriate clinical examination	Online video resources	
Formulate an appropriate differential diagnosis	Online resources, case-based tutorials	Summative assessment: Mid-block quiz (MCQ), end-of-block theory MCQ examination and paper case of a clinical vignette (short answer question format)
Interpret laboratory investigations rationally	Online resources, case-based tutorials	
Be able to institute management of common conditions	Online resources, case-based tutorials	
Explain common surgical procedures such as insertion of an intercostal chest drain, fine needle aspiration, cytology etc.	Online video resources	

of 0.908. Data were analysed using R (R Project for Statistical Computing, USA). Descriptive statistics such as proportions and percentages were used to summarise categorical variables, and median for continuous variables. This study was approved by the Biomedical Research Ethics Committee of UKZN (ref. no. R201/04).

## Results

### Demographic data

The survey response rate was 35% (91/258). The median (interquartile range (IQR)) age of final-year students was 24 (23 - 25) years, with women comprising 58% (53/91) and men 42% (38/91). Most (75%, 68/91) students originated from KwaZulu-Natal, with the majority entering directly into the MB ChB programme after completing their secondary education (78%, 71/91) in the South African public school system.

### Impact of COVID-19 on the surgical teaching and learning programme

Most students (84%, 77/91) understood and approved the need to change to the virtual programme. Regarding the level of preparedness for the internship based on these changes, only 45% (41/91) of students perceived themselves as less prepared.

### Access to online learning and modalities used

Most students accessed the online material/sessions with either a laptop (89%, 81/91) and/or smartphone (80%, 73/91). In terms of internet connectivity, 84% (76/91) had Wi-Fi at their place of study, with other students using mobile data or the UKZN student local area network facility to access the internet. Seventy percent (64/91) of students had some prior experience with online learning, having attended at least one or more online/web-based classes. Most students (89%, 81/91) attended live tutorials presented by staff from the surgical department via the Zoom platform, and browsed content on Moodle.

### Engagement in live Zoom sessions

Most students felt that they had received opportunities in synchronous tutorial sessions to ask questions (97%, 88/91). They also indicated being comfortable participating in online class discussions (66%, 60/91) and experienced a sense of being part of a learning community (64%, 58/91). On the use of innovative methods such as polling and breakout rooms by instructors to facilitate class participation, students indicated that these were used 'sometimes' (44%, 40/91) or 'often' (29%, 29/91).

### Overall module evaluation

Most (89%, 81/91) students experienced the module as well structured,

and valued the supportive administrative processes, and the majority (87%, 79/91) regarded online resource materials as beneficial to their learning. Sixty percent (54/91) experienced a good balance between the theory and its application, with 87% (79/91) finding the module challenging yet stimulating. Seventy percent (64/91) of students indicated that they received sufficient guidance. Seventy-four percent (67/91) of students agreed that there was a good alignment between the content covered and the module assessment, with most (87%, 79/91) agreeing that the time allocation to complete the assessments was fair. Fifty-nine percent of the students (54/91) agreed that they have been adequately prepared to apply their knowledge and skills in a clinical setting.

### General feedback

Themes identified in the analysis of open-ended responses showed that asynchronous aspects allowed students to review resources in their own time. Student challenges related to internet connectivity at residences, and difficulty concentrating when live online sessions exceeded an hour. They were also concerned about lack of clinical exposure to reinforce theoretical knowledge. Students recommended greater use of online quizzes, case-based teaching and clinical exposure (at least once a week). To encourage class participation, students thought the quality of discussion could be improved if instructors had a list of students to call on during the live lectures. Just over a third (34%, 31/91) of students felt that some form of online teaching should continue post pandemic. Students expressed an overwhelmingly positive experience towards the online module, with a median recommendation likelihood score of 8/10 (IQR 6 - 8.75).

## Discussion

At UKZN, teaching was interrupted for 2 months, from 20 March to 27 May 2020, due to the national lockdown and closure of higher education institutions. During this time, transitioning to online teaching occurred to support final-year students towards completing their training, graduation and internship in 2021. Most students agreed to the necessity for measures taken to transition to online teaching. These findings are in keeping with those from a national survey on the impact of the COVID-19 pandemic on final-year medical students in the UK, where 94% (413/440) supported measures taken by medical schools to change curricula were necessary.<sup>[3]</sup> Regarding preparedness for internship, >50% of students felt adequately prepared, in contrast to the UK study, where 59% (261/400) of students felt less prepared for internship. It is reassuring to note that most UKZN students had access to devices and reliable internet connectivity for online learning, with some prior experience with online teaching.

Student engagement is defined as 'a student's emotional, behavioural and cognitive connection to their study'.<sup>[4]</sup> Factors that enhance engagement

are supportive instructors, multiple means of interaction, including the use of interactive technology, creation of a formal and informal learning community, and good course design.<sup>[5,6]</sup> Challenges to engagement include large class groups ( $n=35 - 40$ ) and technical/connectivity issues. Despite these factors, most students experienced positive student-instructor interaction. In the future, student interaction will be explored using more objective tools such as the Dixson Online Engagement Scale.<sup>[7]</sup> The chat function and polling on Zoom were used by some instructors during the live sessions, while others opted for breakout rooms to facilitate small-group work and discussion. However, these were inconsistently used. Reasons could relate to staff's unfamiliarity with these techniques, and the need for further staff training to build confidence in using online teaching methods.

Limitations of the study include the small sample size and limited power to test associations between demographic predictors and outcomes related to clinical preparedness. Challenges of e-learning in surgery are transference of skills, and evaluation of professional behaviours. Videos were used as a substitute for examination and procedural skills training, and priority was placed on developing and assessing clinical reasoning skills of students through case-based teaching. In 2021, modifications were made to the module design based on student feedback and discussion with faculty. These included prior allocation of 4 - 5 students to a particular topic to enhance discussions during live sessions with tutors and peers. Weekly short quizzes of approximately 10 - 15 questions are administered with prompt feedback to test content and prepare students for end of module assessments. Data collection is ongoing, and with larger sample sizes, more robust analyses may be possible. Planning is underway for a hybrid model of instruction comprising large-group Zoom tutorials and small-group allocation to the clinical platform.

## Conclusion

Online teaching in medical education is still a feasible option when remote learning is required. However, it cannot replace clinical exposure. Findings from this study will help set a benchmark for online surgical training at UKZN, and best practices for use in blended teaching models.

**Declaration.** This study is part of a thesis submission by Sumayyah Ebrahim to the University of KwaZulu-Natal (UKZN) for the degree of Doctor of Philosophy (PhD Medicine).

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**Author contributions.** SE wrote the study protocol, performed data collection, analysed the data and drafted the manuscript. JMVW provided supervision and critically reviewed the protocol and manuscript. BS reviewed and approved the manuscript.

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